lulumath

Transformations of Quadratic Graphs #1 - What does a in $y = a(x - h)^2 + k$ do to the graph?

Video Notes

Video Link

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↳ vertex form

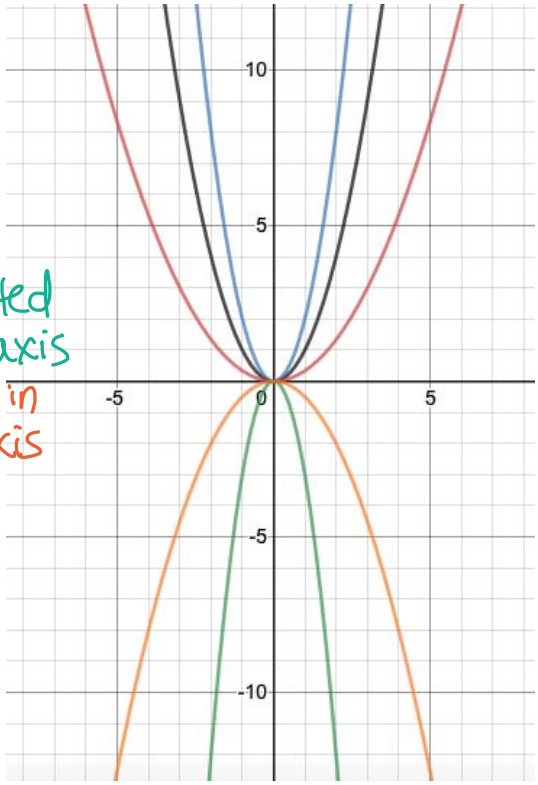
Use graphing technology to see what changing the a value does to the parent graph of a parabola: $y = x^2$.

$y = 2x^2$ → $a = 2$ → ~~narrower~~ TALLER } vertical stretch

$y = \frac{1}{3}x^2$ → $a = \frac{1}{3}$ → ~~wider~~ SHORTER } vertical compression

$y = -3x^2$ → $a = -3$ → ~~narrower~~ + flipped
vertical stretch ↳ reflected in x-axis

$y = -\frac{1}{2}x^2$ → $a = -\frac{1}{2}$ → wider + flipped
vertical compression ↳ reflected in x-axis



Conclusion:

$y = ax^2$ vs. $y = x^2$

$|a| > 1$ → stretched vertically (taller)

$0 < |a| < 1$ → compressed vertically (shorter)

$a < 0$ (negative) → reflected in x-axis